



Draft
Delisting Decision
for the
Locust Fork
Siltation (habitat alteration)

Waterbody ID AL03160111-0208-101

Waterbody ID AL03160111-0305-102

Waterbody ID AL03160111-0308-102

Waterbody ID AL03160111-0404-102

Alabama Department of Environmental Management

Water Quality Branch

Water Division

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Useful Acronyms & Abbreviation

A

<i>A&I</i>	- Agriculture and Industry Use Classification
<i>AAF</i>	- Average Annual Flow
<i>ACES</i>	- Alabama Cooperative Extension Service
<i>ADEM</i>	- Alabama Department of Environmental Management
<i>ADPH</i>	- Alabama Department of Public Health
<i>AEMC</i>	- Alabama Environmental Management Commission
<i>AFO</i>	- Animal Feeding Operation
<i>AL</i>	- Alabama; Aluminum (Metals)
<i>AS</i>	- Arsenic
<i>ASWCC</i>	- Alabama Soil & Water Conservation Committee
<i>AWIC</i>	- Alabama Water Improvement Commission

B

<i>BAT</i>	- Best Available Technology
<i>BCT</i>	- Best Conventional Pollutant Control Technology
<i>BMP</i>	- Best Management Practices
<i>BOD</i>	- Biochemical Oxygen Demand
<i>BPJ</i>	- Best Professional Judgment

C

<i>CAFO</i>	- Concentrated Animal Feeding Operation
<i>CBOD₅</i>	- Five-Day Carbonaceous Biochemical Oxygen Demand
<i>CBOD_u</i>	- Ultimate Carbonaceous Biochemical Oxygen Demand
<i>CFR</i>	- Code of Federal Regulations
<i>CFS</i>	- Cubic Feet per Second
<i>CMP</i>	- Coastal Monitoring Program
<i>COD</i>	- Chemical Oxygen Demand
<i>CPP</i>	- Continuing Planning Process
<i>CWA</i>	- Clean Water Act
<i>CY</i>	- Calendar Year

D

<i>DA</i>	- Drainage Area
<i>DEM</i>	- Digital Elevation Model
<i>DMR</i>	- Discharge Monitoring Report
<i>DNCR</i>	- Department of Conservation & Natural Resources
<i>DO</i>	- Dissolved Oxygen

E

<i>EFDC</i>	- Environmental Fluid Dynamics Code
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F

<i>F&W</i>	- Fish and Wildlife Use Classification
<i>FDA</i>	- Food and Drug Administration
<i>Fe</i>	- Iron
<i>FO</i>	- Field Operations
<i>FS</i>	- Forestry Service (US)
<i>FY</i>	- Fiscal Year

G

<i>GIS</i>	- Geographic Information Systems
<i>GOMA</i>	- Gulf of Mexico Alliance
<i>GPS</i>	- Global Positioning System
<i>GS</i>	- Growing Season
<i>GSA</i>	- Geological Survey of Alabama

H

<i>HCR</i>	- Hydrographic Controlled Release
<i>Hg</i>	- Mercury
<i>HUC</i>	- Hydrologic Unit Code

I

<i>IBI</i>	- Index of Biotic Integrity
<i>IF</i>	- Incremental Flow
<i>IWC</i>	- Instream Waste Concentration

L

<i>LA</i>	- Load Allocation
<i>Lat/Long</i>	- Latitude / Longitude
<i>LDC</i>	- Load Duration Curve
<i>LIDAR</i>	- Light Detection & Ranging
<i>LSPC</i>	- Load Simulation Program C
<i>LWF</i>	- Limited Warmwater Fishery Use Classification

M

<i>m³/s</i>	- Cubic Meters per Second
<i>MAF</i>	- Mean Annual Flow (MAF = AAF)
<i>mg/l</i>	- Milligrams per Liter
<i>MGD</i>	- Million Gallons per Day
<i>mi</i>	- Miles
<i>MOS</i>	- Margin of Safety
<i>MS4s</i>	- Municipal Separate Storm Sewer Systems
<i>MZ</i>	- Mixing Zone

N

<i>N</i>	- Nitrogen
<i>NA</i>	- Not Applicable
<i>NASS</i>	- National Agricultural Statistics Service
<i>NBOD_x</i>	- Nitrogenous Biochemical Oxygen Demand
<i>NED</i>	- National Elevation Database
<i>NH₃-N</i>	- Ammonia Nitrogen
<i>NHD</i>	- National Hydrography Database
<i>NLCD</i>	- National Land Cover Dataset
<i>NO₃+NO₂-N</i>	-Nitrate + Nitrite Nitrogen
<i>NOAA</i>	- National Oceanic and Atmospheric Administration
<i>NOV</i>	- Notice of Violation
<i>NPDES</i>	- National Pollutant Discharge Elimination Syst
<i>NPS</i>	- Non-Point Source
<i>NRCS</i>	- National Resource Conservation Service
<i>NTUs</i>	- Nephelometric Turbidity Units
<i>NWS</i>	- National Weather Service

O

<i>OAW</i>	- Outstanding Alabama Water Use Classification
<i>OE</i>	- Organic Enrichment
<i>ONRW</i>	- Outstanding National Resource Water

P

<i>P</i>	- Phosphorus
<i>Pb</i>	- Lead
<i>PCBs</i>	- Polychlorinated Biphenyl
<i>pH</i>	- Concentration of Hydrogen Ions Scale
<i>POTW</i>	- Publicly Owned Treatment Works
<i>ppb</i>	- Parts per Billion
<i>ppm</i>	- Parts per Million
<i>ppt</i>	- Parts per Trillion
<i>PS</i>	- Point Source
<i>PWS</i>	- Public Water Supply Use Classification
<i>PWSS</i>	- Public Water Supply System

Q

<i>Q</i>	- Flow (MGD, m ³ /s, cfs)
<i>QA/QC</i>	- Quality Assurance / Quality Control
<i>QAPP</i>	- Quality Assurance Project Plan

R

<i>RRMP</i>	- River and Reservoirs Monitoring Program
<i>RSMP</i>	- River and Streams Monitoring Program

S

<i>S</i>	- Swimming and Other Whole Body Waters Contact Sports Use Classification
<i>SH</i>	- Shellfish Harvesting Use Classification

S (cont)

<i>SID</i>	- State Indirect Discharge
<i>SMZ</i>	- Streamside Management Zone
<i>SOD</i>	- Sediment Oxygen Demand
<i>SOP</i>	- Standard Operating Procedure
<i>SRF</i>	- State Revolving Fund
<i>SSO</i>	- Sanitary Sewer Overflow
<i>STP</i>	- Sewage Treatment Facility
<i>SW</i>	- Surface Water
<i>SWMP</i>	- Stormwater Management Plan
<i>SWQM</i>	- Spreadsheet Water Quality Model (AL)
<i>SWQMP</i>	- Surface Water Quality Monitoring Program

T

<i>TBC</i>	- Technology-Based Controls
<i>TBD</i>	- To be Determined
<i>TDS</i>	- Total Dissolved Solids
<i>TKN</i>	- Total Kjeldahl Nitrogen
<i>TMDL</i>	- Total Maximum Daily Load
<i>TON</i>	- Total Organic Nitrogen
<i>TOT</i>	- Time of Travel
<i>Total P</i>	- Total Phosphorus
<i>TSS</i>	- Total Suspended Solids
<i>TVA</i>	- Tennessee Valley Authority

U

<i>UAA</i>	- Use Attainability Analysis
<i>UIC</i>	- Underground Injection Control
<i>USDA</i>	- United States Department of Agriculture
<i>USGS</i>	- United States Geological Survey
<i>USEPA</i>	- United States Environmental Protection Agency
<i>USFWS</i>	- United States Fish & Wildlife Services
<i>UT</i>	- Unnamed Tributary
<i>UV</i>	- Ultraviolet Radiation

W

<i>WASP</i>	- Water Quality Analysis Simulation Program
<i>WCS</i>	- Watershed Characterization System
<i>WET</i>	- Whole Effluent Toxicity
<i>WLA</i>	- Wasteload Allocation
<i>WMA</i>	- Wildlife Management Area
<i>WPCP</i>	- Wastewater Pollution Control Plant
<i>WQB</i>	- Water Quality Branch
<i>WRDB</i>	- Water Resources Database
<i>WTP</i>	- Water Treatment Plant
<i>WWTF</i>	- Wastewater Treatment Facility
<i>WWTP</i>	- Wastewater Treatment Plant
<i>WY</i>	- Water Year

Chapter 1. Introduction

1.1. Executive Summary

The purpose of this report is to present information that substantiates the removal of the four siltation impaired segments of the Locust Fork from the Department's current 2016 §303(d) list based upon the conclusion that the Locust Fork is now fully supporting its designated uses with respect to siltation.

The Locust Fork was originally added by the U.S. Environmental Protection Agency (USEPA) to Alabama's §303(d) list in 1998 with nutrients and siltation listed as the pollutants of concern. The EPA's addition of this impaired segment of the Locust Fork was based upon a review of federally threatened and endangered species data published by the U.S. Fish and Wildlife Service (FWS) in 1996. The EPA reached the conclusion that this segment of the Locust Fork "no longer supported" its use classification due to a nutrient and siltation impairment.

At the time of the Department's inclusion of the Locust Fork on the 1998 §303(d) List, the siltation impaired reach consisted of two individual segments. In 2004, the segment AL03160111-120_01 was re-segmented from one single segment, formerly representing the entire 47.3 mile long impaired reach, to three individual segments in order to accurately depict the designated use classification of each individual segment. The table below is an excerpt from the Department's current 2016 §303(d) list providing additional information about the segments listed as impaired for siltation.

Table 1.1 Locust Fork Siltation Impaired Segments on Department's 2016 §303(d) List

Assessment Unit ID	County	Uses	Size (miles)	Downstream/Upstream Locations	Year Listed
AL03160111-0208-101 ^a	Blount	F&W	27.18	Little Warrior River/Blount County Rd 30	1998
AL03160111-0305-102 ^b	Blount/ Jefferson	F&W	18.15	County Road between Hayden and County Line/ Little Warrior River	1998
AL03160111-0308-102 ^b	Blount/ Jefferson	PWS/S /F&W	14.86	US Highway 31 / County Road Between Hayden and County Line	1998
AL03160111-0404-102 ^b	Blount/ Jefferson	S/F&W	14.25	Jefferson County Road 77 / US Highway 31	1998

a. Former segment AL/03160111-050_03

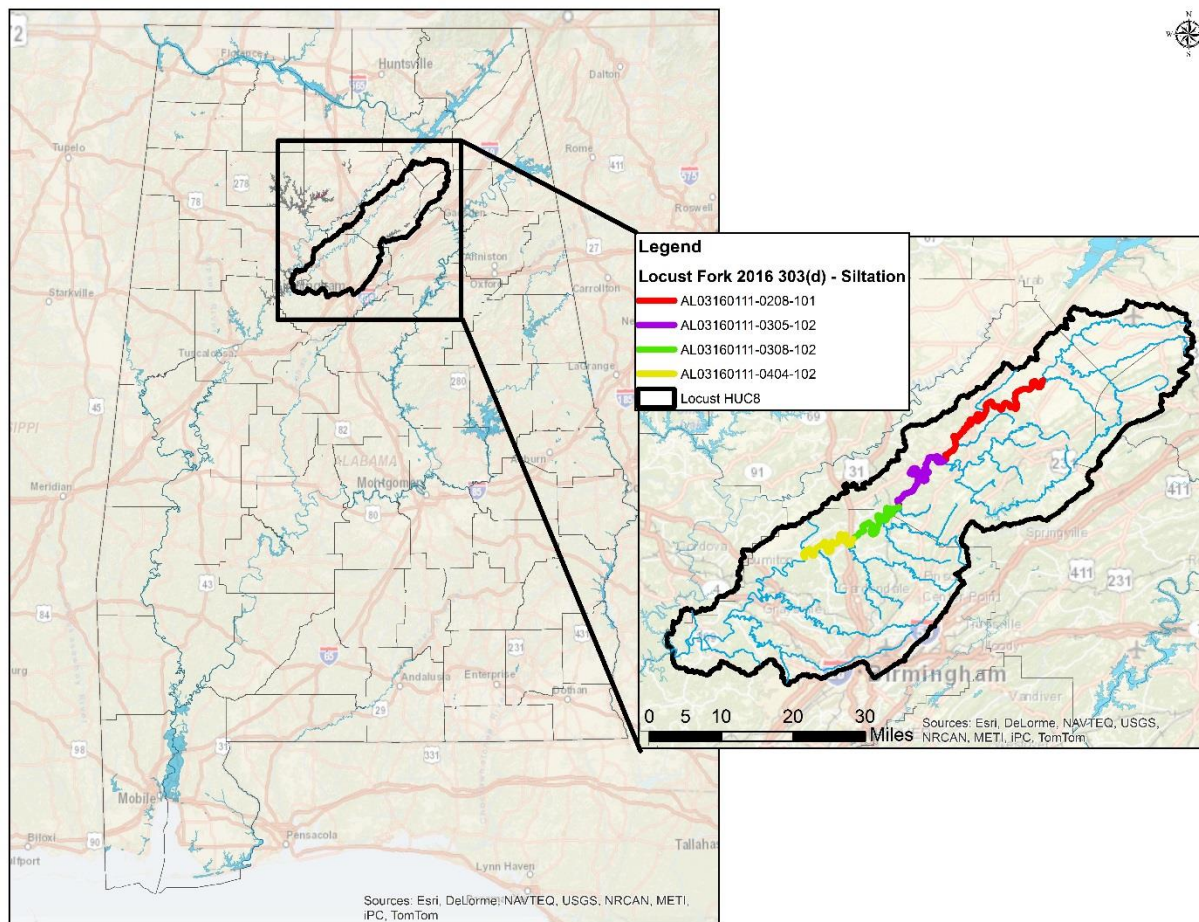
b. Former segment AL/03160111-120_01

The following information was used to arrive at an overall use support determination for siltation: macroinvertebrate assessments, habitat assessments, and a cumulative assessment of all the available surface water quality total suspended solid (TSS) and turbidity data. Based upon an assessment of the available data, the Department has determined that a siltation impairment does not currently exist. Therefore, ADEM will not develop a TMDL for siltation due to "more recent or accurate data," which is just cause for delisting a waterbody according to Title 40 of the Code of Federal Regulations (CFR), Part 130.7(b)(6)(iv).

1.2 Locust Fork Background Information

The Locust Fork is a major tributary to the Black Warrior River. The Locust Fork watershed is primarily located in Jefferson and Blount counties, although the north-eastern headwater extent also resides in Marshall and Etowah counties. The Locust Fork flows southwest for a total stream length of 160 miles before its confluence with the Mulberry Fork in Bankhead Lake Reservoir. The total watershed drainage area is approximately 1209 square miles. The Locust Fork is the second longest free-flowing river in Alabama and as such the river has garnered the reputation for being a premiere whitewater destination in the Southeast.

Figure 1.2.1 Locust Fork Watershed Location



The Department has assigned designated uses for all the assessed waterbodies found in the Locust Fork watershed. Designated uses describe the best uses that can be reasonably expected for those particular waters. The mainstem of the Locust Fork includes the following designated uses: Public Water Supply (PWS), Swimming (S), and Fish and Wildlife (F&W). The highlighted segments in red shown below have been placed in Category 5 and listed on the Department's §303(d) List, meaning those particular segments are considered impaired and are consequently not meeting their designated use classifications.

Figure 1.2.2 Locust Fork Watershed – Waterbody Designated Uses and 2016 §303(d) Segments

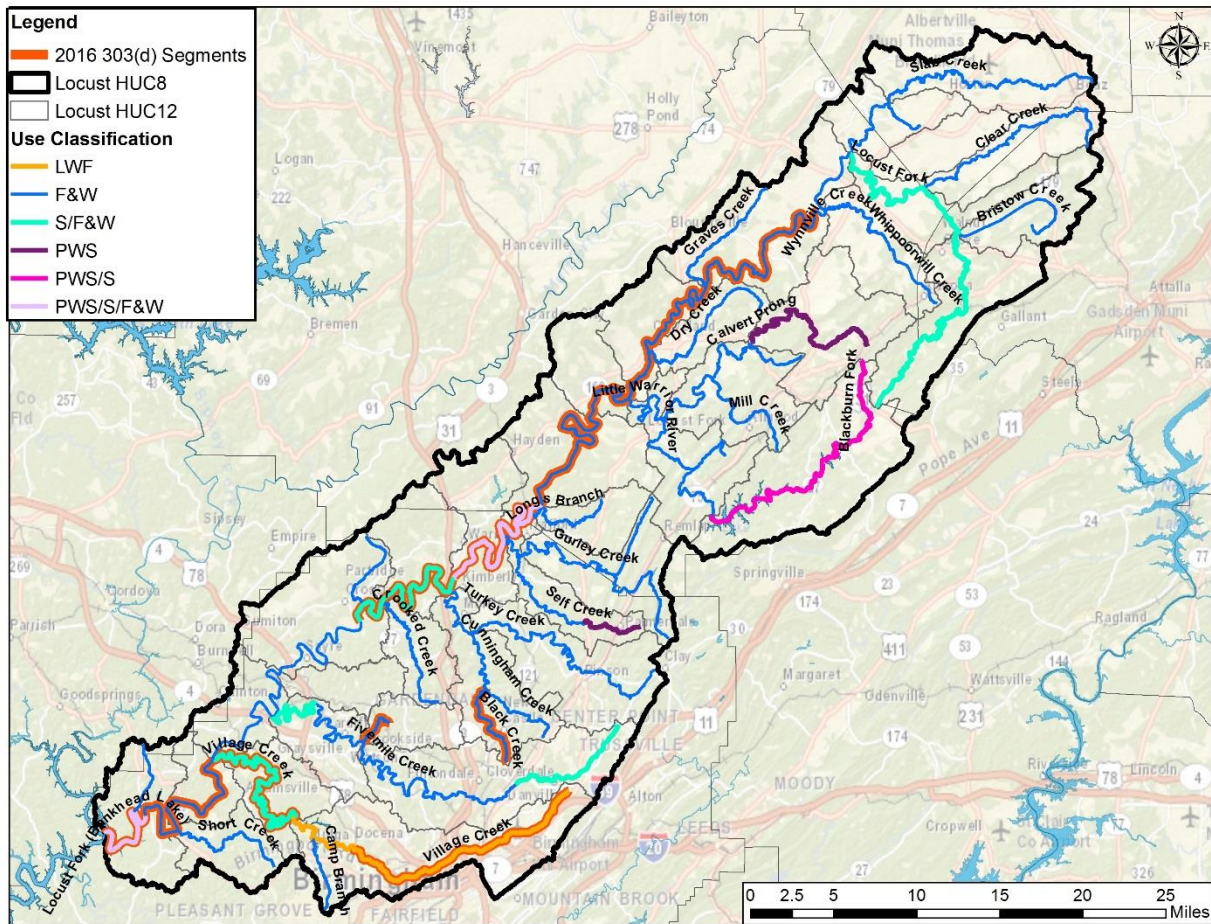


Table 1.2.1 on the following page provides additional information for all of the assessed waterbodies in the Locust Fork watershed, including the 2016 assessment unit, use classification, and waterbody category.

Table 1.2.1 Locust Fork Watershed – Waterbody Designated Uses and Categories

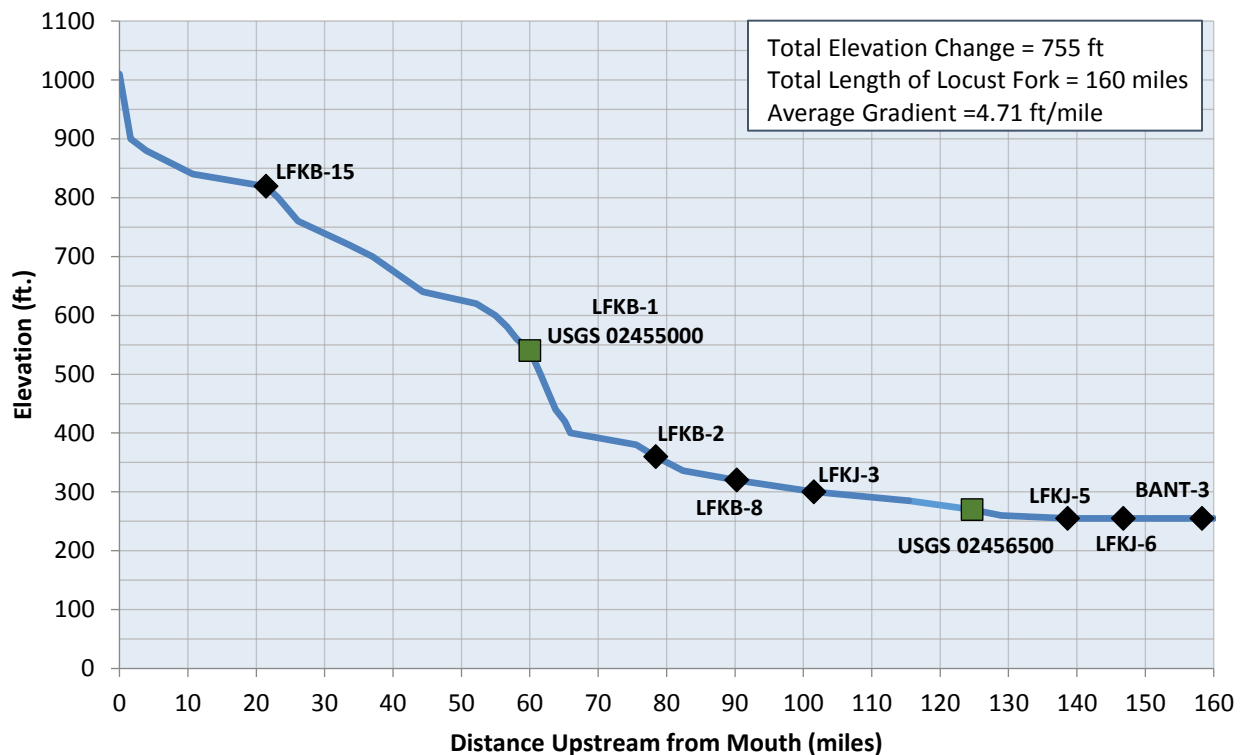
2016 ASSESSMENT ID	WATERBODY	USE CLASS	DOWNSTREAM EXTENT	UPSTREAM EXTENT	CATEGORY
AL03160111-0307-400	Black Creek	F&W	Cunningham Creek	its source	5
AL03160111-0204-111	Blackburn Fork	PWS	Inland Lake Dam	extent of reservoir	1
AL03160111-0204-102	Blackburn Fork	PWS	Inland Lake	Highland Lake Dam	1
AL03160111-0204-103	Blackburn Fork	PWS	Highland Lake Dam	extent of reservoir	1
AL03160111-0204-104	Blackburn Fork	PWS	Highland Lake	Its source	1
AL03160111-0207-300	Blackburn Fork	F&W	Little Warrior River	Inland Lake Dam	1
AL03160111-0101-100	Bristow Creek	F&W	Locust Fork	Its source	2B
AL03160111-0206-101	Calvert Prong	F&W	Little Warrior River	Whited Creek	1
AL03160111-0206-102	Calvert Prong	PWS	Whited Creek	Its source	1
AL03160111-0408-300	Camp Branch	F&W	Bayview Lake	Its source	4A
AL03160111-0206-500	Chitwood Creek	F&W	Calvert Prong	Its source	3
AL03160111-0103-100	Clear Creek	F&W	Locust Fork	Its source	2B
AL03160111-0413-600	Coal Creek	F&W	Locust Fork	its source	2A
AL03160111-0401-100	Crooked Creek	F&W	Locust Fork	Its source	2B
AL03160111-0307-200	Cunningham Creek	F&W	Turkey Creek	Its source	3
AL03160111-0203-100	Dry Creek	F&W	Locust Fork	Its source	5
AL03160111-0407-100	Fivemile Creek	F&W	Locust Fork	Its source	4B
AL03160111-0202-200	Graves Creek	F&W	Locust Fork	Its source	4A
AL03160111-0304-100	Gurley Creek	F&W	Locust Fork	Its source	1
AL03160111-0207-900	Hendrick Mill Branch	F&W	Blackburn Fork	Its source	1
AL03160111-0106-110	Little Reedbrake Creek	F&W	Slab Creek	Its source	2B
AL03160111-0207-100	Little Warrior River	F&W	Locust Fork	Its source	1
AL03160111-0202-102	Locust Fork	F&W	Blount County Road 30	Its source	1
AL03160111-0413-101	Locust Fork	PWS/S / F&W	Junction of Locust and Mulberry Forks	Jefferson County Highway 61	5
AL03160111-0410-100	Locust Fork	F&W	Village Creek	Jefferson County Road 77	2B
AL03160111-0208-101	Locust Fork	F&W	Little Warrior River	Blount County Road 30	5
AL03160111-0305-102	Locust Fork	F&W	County road between Hayden and County Line	Little Warrior River	5
AL03160111-0308-102	Locust Fork	PWS/ F&W	US Highway 31	county road between Hayden and County Line	5
AL03160111-0404-102	Locust Fork	F&W	Jefferson County Road 77	US Highway 31	5
AL03160111-0413-112	Locust Fork	F&W	Jefferson County Highway 61	Village Creek	5
AL03160111-0302-100	Longs Branch	F&W	Locust Fork	Its source	2A
AL03160111-0206-800	Mill Creek	F&W	Chitwood Creek	Its source	3
AL03160111-0405-101	Newfound Creek	F&W	Fivemile Creek	Impoundment	5
AL03160111-0303-200	Sand Valley Creek	F&W	Gurley Creek	Its source	2B
AL03160111-0304-201	Self Creek	F&W	Gurley Creek	Alabama Highway 79	2B
AL03160111-0304-202	Self Creek	PWS	Alabama Highway 79	Its source	2B
AL03160111-0411-100	Short Creek	F&W	Locust Fork	Its source	1
AL03160111-0106-100	Slab Creek	F&W	Locust Fork	Its source	2B
AL03160111-0307-100	Turkey Creek	F&W	Locust Fork	Its source	2A
AL03160111-0409-100	Village Creek	F&W	Locust Fork	Bayview Lake Dam	5
AL03160111-0408-101	Village Creek	LWF	Bayview Lake Dam	Second Creek	4A
AL03160111-0408-102	Village Creek	LWF	Second Creek	Woodlawn Bridge	5
AL03160111-0408-103	Village Creek	LWF	Woodlawn Bridge	Its source	5
AL03160111-0404-500	Ward Creek	F&W	Locust Fork	Its source	2B
AL03160111-0201-600	Whippoowill Creek	F&W	Wynnvill Creek	Its source	3
AL03160111-0206-700	Whited Creek	F&W	Calvert Prong	Its source	3
AL03160111-0201-100	Wynnvill Creek	F&W	Locust Fork	Its source	2B

1.2.1 Hydrology

The physical properties of the Locust Fork, including the diversity of habitat, benthic substrate, and channel shape, all vary significantly depending on the location in the watershed. The headwater sections of the Locust Fork are generally characterized by riffle-run habitat type and the dominate substrate consists primarily of gravel with some boulder and cobble. Progressing downstream, the habitat type transitions to a glide-pool type stream and the dominant benthic substrate consists primarily of sand, with some gravel.

Downstream of US Highway 78 (rivermile 135 in the graph below), the Locust Fork transitions to a mature first or second order river with a lower gradient (slope) and generally a slower ambient velocity. The Bankhead reservoir heavily influences the hydrodynamic conditions (discharge, stage height, and velocity) of the downstream 30 miles of the Locust Fork.

Figure 1.2.1.1 Locust Fork Elevation Gradient



Currently, there are twelve realtime USGS streamflow stations actively monitoring streamflow on six different waterbodies in the Locust Fork watershed. Two realtime active USGS streamflow stations are located directly on the mainstem of the Locust Fork. The following pages illustrate the location of the USGS streamflow stations in the watershed, along with accompanying stream low flow statistics and flow duration curves for the USGS stations located directly on the Locust Fork.

Table 1.2.1.1 Realtime USGS Stream Gages in Locust Fork Watershed

Agency	Site Number	Site Name
USGS	02455000	LOCUST FORK NEAR CLEVELAND, AL.
USGS	02455185	BLACKBURN FORK LITTLE WARRIOR R NR HOLLY SPRINGS
USGS	02455980	TURKEY CREEK AT SEWAGE PLANT NEAR PINSON AL
USGS	02456500	LOCUST FORK AT SAYRE, AL.
USGS	02457000	FIVEMILE CREEK AT KETONA AL
USGS	02457595	FIVEMILE CREEK NEAR REPUBLIC, AL
USGS	02458148	VILLAGE CREEK AT 86TH ST NORTH AT ROEBUCK, AL.
USGS	02458190	TRIB TO VILLAGE CREEK AT 50th ST IN BIRMINGHAM
USGS	02458300	VILLAGE CREEK AT 24TH ST. AT BIRMINGHAM, AL
USGS	02458450	VILLAGE CREEK AT AVENUE W AT ENSLEY, AL
USGS	02458502	VILLAGE CREEK NEAR PRATT CITY, ALABAMA
USGS	02458600	VILLAGE CREEK NEAR DOCENA, ALABAMA

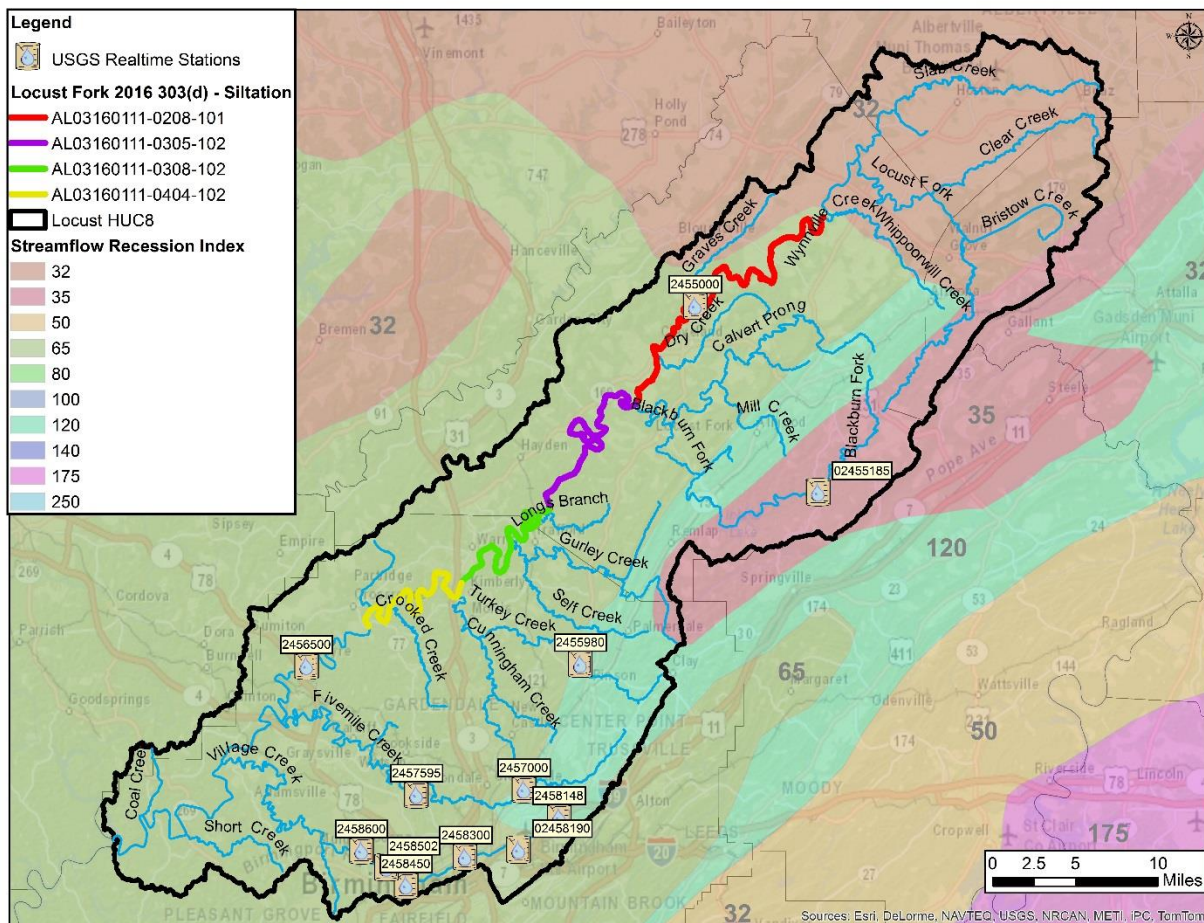
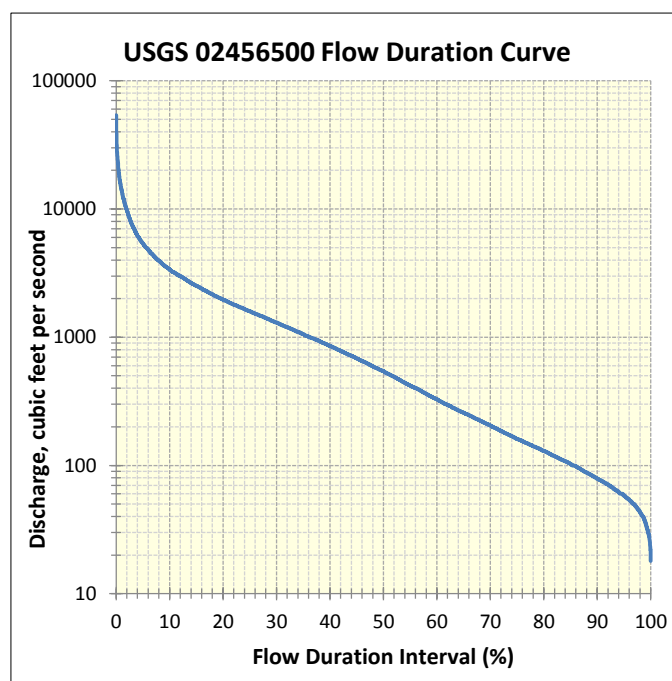
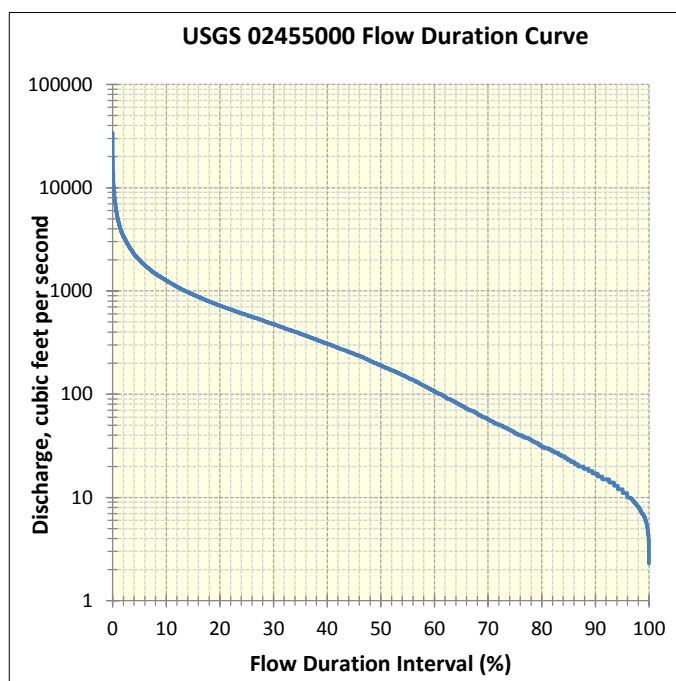
Figure 1.2.1.2 Location of Realtime USGS Stream Flow Gages in Locust Fork Watershed

Figure 1.2.1.3 Locust Fork USGS Gage Low Flow Statistics

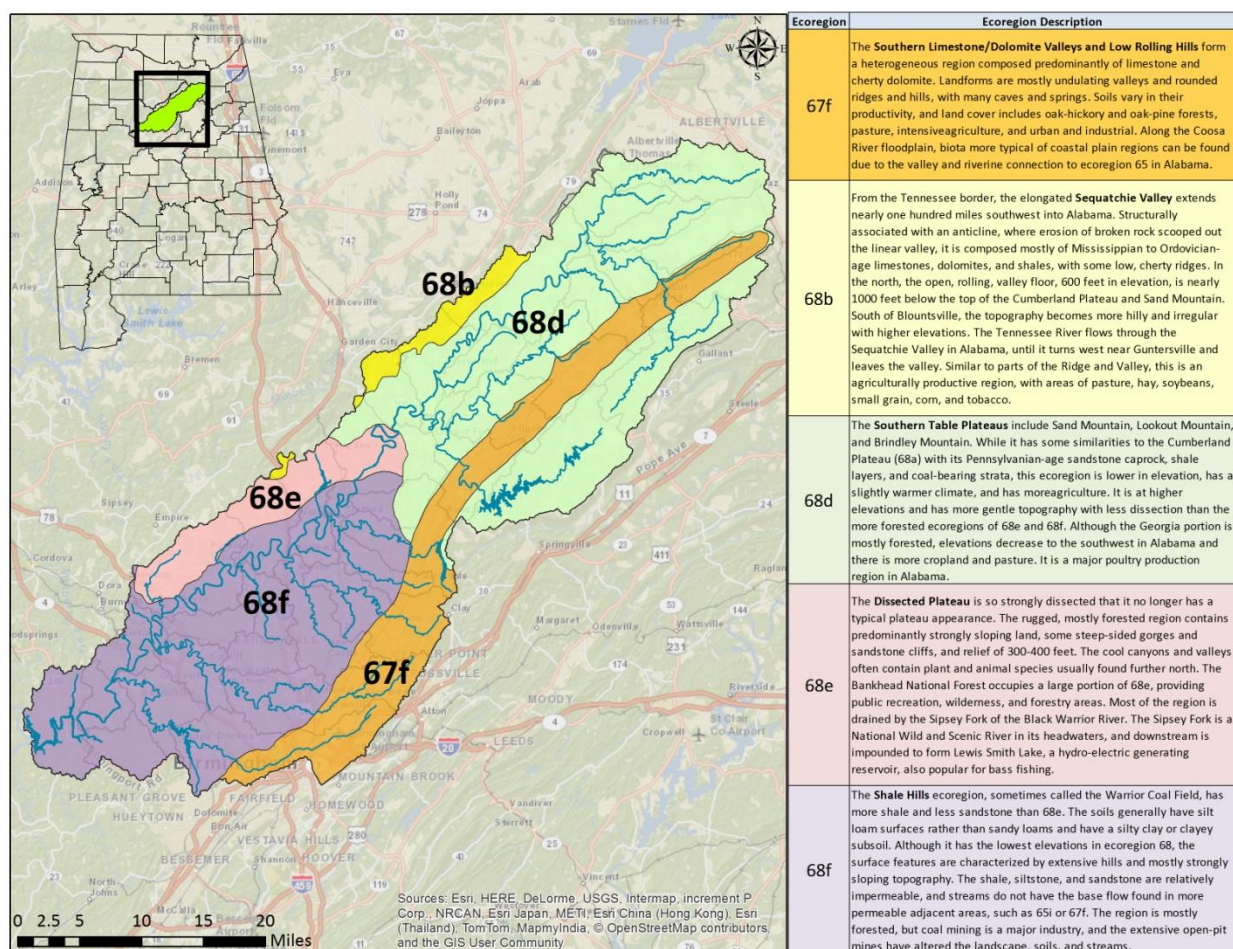
Name	Locust Fork Near Cleveland, AL.
USGS Gage #	02455000
Period of Record	12/01/1936 to 5/31/2016
Coordinates	34.0244, -86.5742
Drainage Area (mi ²):	303
7Q10 (cfs):	5.68
7Q2 (cfs):	12.28
1Q10 (cfs):	5.12

Name	Locust Fork at Sayre, AL
USGS Gage #	02456500
Period of Record	10/01/1928 to 9/30/2016
Coordinates	33.7097, -86.9833
Drainage Area (mi ²):	885
7Q10 (cfs):	31.12
7Q2 (cfs):	58.19
1Q10 (cfs):	27.82



1.2.2 Eco-Regions

The Locust Fork watershed is comprised of two Level III Ecoregions: 67-Ridge and Valley and 68-Southwestern Appalachians. The watershed can be further subdivided into the following Level IV Ecoregions: 67f Southern Limestone/Dolomite Valleys and Low Rolling Hills (17%), 68b Sequatchie Valley (2%), 68d Southern Table Plateaus (39%), 68e Dissected Plateau (7%), 68f Shale Hills (34%). The figure below illustrates the aforementioned Level IV ecoregions found in the Locust Fork Watershed and provides a brief description of each ecoregion.

Figure 1.2.2.1 Locust Fork Watershed Level IV Eco-regions

1.2.3 Environmental Importance

As previously discussed, the Locust Fork is a valuable natural resource within the state of Alabama. The waterbody provides numerous benefits to the residents of Alabama including, but not limited to, the following:

- Swimming and other water sports
- Outdoor recreational activities including fishing, canoeing, and whitewater rafting
- Available pollutant assimilation from point sources located throughout the watershed

Furthermore, the Locust Fork watershed also supports a tremendously diverse population of aquatic flora and fauna. A partnership effort involving the U.S. Fish and Wildlife Service (USFWS), Alabama Department of Conservation and Natural Resources (ADCNR) and the Geological Survey of Alabama (GSA) have identified the Locust Fork watershed as critical habitat for several threatened and endangered species of fish, snails, and mussels. The table below lists the aquatic

fauna currently identified by the U.S. Fish and Wildlife Service (USFWS) as being threatened or endangered that are found in the Locust Fork watershed.

Table 1.2.3.1 Threatened & Endangered Fauna in Locust Fork Watershed

Scientific name	Common name	Species	USFWS	Alabama Conservation
<i>Elliptio arca</i>	Alabama Spike	Mussel		P1
<i>Elliptio arcata</i>	Delicate Spike	Mussel		P2
<i>Hamiota perovalis</i>	Orangenacre Mucket	Mussel	Threatened	P2
<i>Medionidus acutissimus</i>	Alabama	Mussel	Threatened	P1
<i>Medionidus parvulus</i>	Coosa Moccasinshell	Mussel	Endangered	P1
<i>Pleurobema furvum</i>	Dark Pigtoe	Mussel	Endangered	P1
<i>Ptychobranchus greenii</i>	Triangular Kidneyshell	Mussel	Endangered	P1
<i>Elimia melanoides</i>	Black Mudalia	Snail	Candidate	P2
<i>Fontigens nickliniana</i>	Watercress Snail	Snail		P1
<i>Leptoxis plicata</i>	Plicate Rocksnail	Snail	Endangered	P1
<i>Etheostoma bellator</i>	Warrior Darter	Fish		P2
<i>Etheostoma chermocki</i>	Vermillion Darter	Fish	Endangered	P1
<i>Etheostoma nuchale</i>	Watercress Darter	Fish	Endangered	P1
<i>Etheostoma phytophilum</i>	Rush Darter	Fish	Endangered	P1
<i>Etheostoma sp cf bellator</i>	Locust Fork Darter	Fish		P2
<i>Notropis cahabae</i>	Cahaba Shiner	Fish	Endangered	P1
<i>Percina brevicauda</i>	Coal Darter	Fish		P2
<i>Necturus alabamensis</i>	Black Warrior	Salamander	Candidate	P1
<i>Sternotherus depressus</i>	Flattened musk turtle	Turtle	Threatened	P1

P1 – Highest Conservation Concern

P2 – High Conservation Concern

Chapter 2. Problem Definition

2.1 §303(d) List History

Section 303(d) of the Clean Water Act (CWA), as amended by the Water Quality Act of 1987 and EPA's Water Quality Planning and Management Regulations (Title 40 of the Code of Federal Regulations (CFR), Part 130), requires states to identify waterbodies that are not meeting water quality standards applicable to their designated use classifications. The identified waters are prioritized based on severity of pollution with respect to designated use classifications, and listed on each state's §303(d) List of Impaired Waters. If subsequent water quality sampling shows that segments listed in a previous cycle are meeting applicable water quality standards and fully supporting their use classification(s), the waterbody can be proposed as a candidate for delisting based on more recent or more accurate data.

2.1.1 Locust Fork §303(d) Listing History

The Locust Fork was originally added by the U.S. Environmental Protection Agency (USEPA) to Alabama's §303(d) list in 1998 with nutrients and siltation listed as the pollutants of concern. The EPA's addition of this impaired segment of the Locust Fork was based upon a review of federally threatened and endangered species data published by the U.S. Fish and Wildlife Service (FWS) in 1996. The EPA coupled this information with subwatershed species occurrence data provided by both the Nature Conservancy and Alabama Natural Heritage Program (ANHP). The EPA reached the conclusion that this segment of the Locust Fork "no longer supported" its use classification due to a nutrient and siltation impairment which had consequently led to the extirpation of the federally endangered Plicate Rocksnail (*Leptoxis plicata*) formerly found in the watershed.

At the time of the Department's inclusion of the Locust Fork on the 1998 §303(d) List, the siltation impaired reach consisted of two individual segments. The table below illustrates the impaired reaches as they appeared on the Department's 1998 §303(d) List:

Table 2.1.1.1 Locust Fork Siltation Impaired Segments on Department's 1998 §303(d) List

Assessment Unit ID	County	Uses	Size (miles)	Downstream/Upstream Locations	Year Listed
AL/03160111-050_03	Blount	F&W	21.8	Little Warrior River/Blount County Rd 30	1998
AL/03160111-120_01	Blount/ Jefferson	F&W	47.3	Jefferson Co Rd 77 / Little Warrior River	1998

In 2004, the segment AL03160111-120_01 was re-segmented from one single segment, formerly representing the entire 47.3 mile long impaired reach, to three individual segments in order to accurately describe the designated use classification of each individual segment. Furthermore, the total impaired stream length for segment AL/03160111-050_03 was revised from 21.8 miles to 27.18 miles. The table below is an excerpt from the Department's 2016 §303(d) list providing additional information about the listed segments impaired for siltation on the Locust Fork. Refer to "Figure 3.2.1 Locust Fork 2012 §303(d) Monitoring Project Stations" for a map depicting the relative location of the impaired reaches in the watershed.

Table 2.1.1.2 Locust Fork Siltation Impaired Segments on Department's 2016 §303(d) List

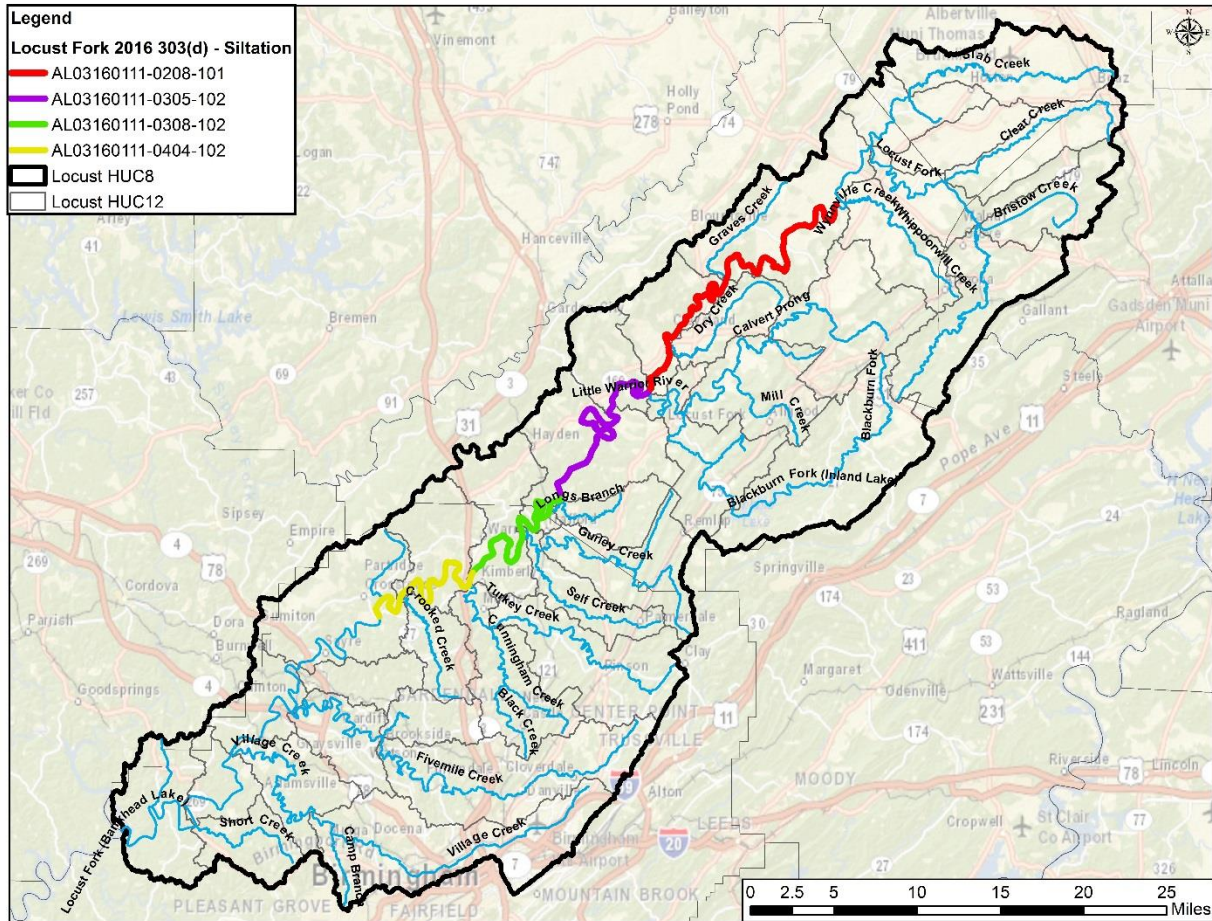
Assessment Unit ID	County	Uses	Size (miles)	Downstream/Upstream Locations	Year Listed
AL03160111-0208-101 ^a	Blount	F&W	27.18	Little Warrior River/Blount County Rd 30	1998
AL03160111-0305-102 ^b	Blount/ Jefferson	F&W	18.15	County Road between Hayden and County Line/ Little Warrior River	1998
AL03160111-0308-102 ^b	Blount/ Jefferson	PWS/S /F&W	14.86	US Highway 31 / County Road Between Hayden and County Line	1998
AL03160111-0404-102 ^b	Blount/ Jefferson	S/F&W	14.25	Jefferson County Road 77 / US Highway 31	1998

a. Former segment AL/03160111-050_03

b. Former segment AL/03160111-120_01

The figure below illustrates the listed siltation impaired segments on the Locust Fork that are addressed in this Delisting Decision:

Figure 2.1.1.1 Locust Fork Siltation 2016 §303(d) Segments



Chapter 3. Technical Basis For Delisting Decision

3.1 Applicable Water Quality Criteria

ADEM's decision to delist the Locust Fork for siltation was authorized under ADEM's Water Quality Standards Program, which employs both numeric and narrative criteria to ensure adequate protection of designated uses for surface waters of the State. Numeric criteria typically have quantifiable endpoints for given parameters such as pH, dissolved oxygen, or turbidity. The ADEM Admin. Code r. 335-6-10-.09(5)(e)9 describes the specific numeric water quality criterion for turbidity, applicable for all designated uses:

"There shall be no turbidity other than of natural origin that will cause substantial visible contrast with the natural appearance of the waters or interfere with any beneficial uses which they serve. Furthermore, in no case shall the turbidity exceed 50 NTU above background. Background will be

interpreted as the natural condition of the receiving water without the influence of man-made or man-induced causes. Turbidity caused by natural runoff will be included in establishing background levels.

Narrative criteria are qualitative statements that establish a set of desired conditions for all State waters. These narrative criteria are more commonly referred to as “free from” criteria that enable States a regulatory avenue to address pollutants or problems that may be causing or contributing to a use impairment that otherwise cannot be evaluated against any numeric criteria.

Historically, in the absence of established numeric criteria, ADEM and/or EPA would use available data and information coupled with best professional judgment to determine overall use support for a given waterbody. Narrative criteria continue to serve as a basis for determining use attainability and subsequently listing/delisting of waters from Alabama’s §303(d) List. ADEM’s Narrative Criteria are shown in ADEM Admin. Code r. 335-6-10-.06 as follows:

335-6-10-.06 Minimum Conditions Applicable to All State Waters. *The following minimum conditions are applicable to all State waters, at all places and at all times, regardless of their uses:*

- (a) State waters shall be free from substances attributable to sewage, industrial wastes or other wastes that will settle to form bottom deposits which are unsightly, putrescent or interfere directly or indirectly with any classified water use.*
- (b) State waters shall be free from floating debris, oil, scum, and other floating materials attributable to sewage, industrial wastes or other wastes in amounts sufficient to be unsightly or interfere directly or indirectly with any classified water use.*
- (c) State waters shall be free from substances attributable to sewage, industrial wastes or other wastes in concentrations or combinations, which are toxic or harmful to human, animal or aquatic life to the extent commensurate with the designated usage of such waters.*

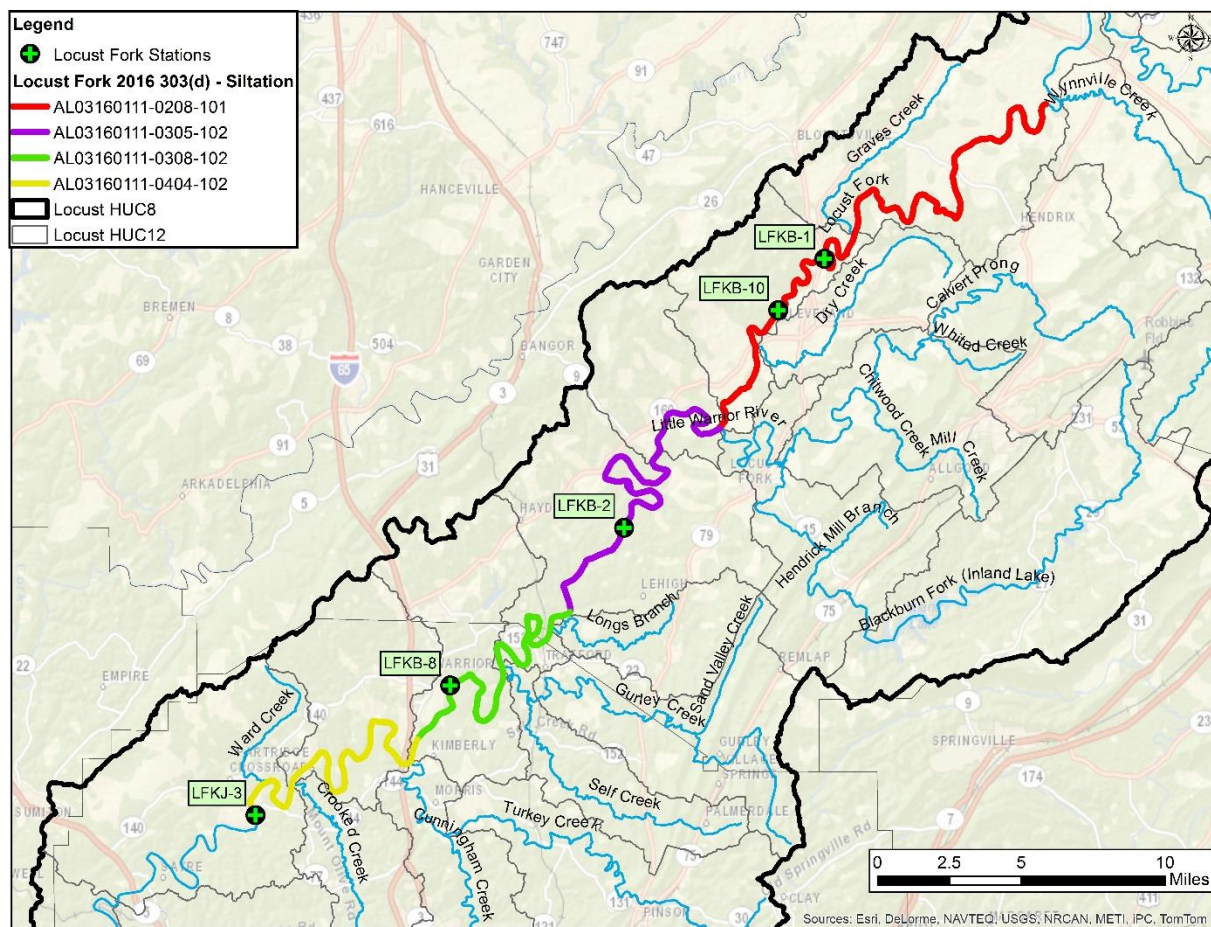
3.2 Water Quality Data Sources and Availability

The data that was utilized in this evaluation of the siltation impairments on the Locust Fork is from the Department’s Ambient Trent Monitoring program, 2012 §303(d) sampling program, and the 2014 Alabama Rivers and Stream Network Sampling Water Quality Monitoring Program. During the sampling period, field parameters, conventional lab parameters, macro-invertebrate community assessments, and habitat assessments were collected at several stations along the listed segments of the Locust Fork. The table below gives additional information in regards to the ADEM station locations and descriptions. See Figure 3.2.1 below for an illustration of the station locations in the watershed.

Table 3.2.1 Locust Fork Monitoring 2012 – 2016 Stations

Station ID	Trend Station	Latitude	Longitude	Location Description	Years Sampled (Frequency)
LFKB-1	Yes	34.02370	-86.57334	Locust Fork at ALA HWY 231	2012 (8x), 2015 (3x), 2016 (3x)
LFKB-10		33.99786	-86.60153	Locust Fork at Swann Bridge	2014 (7x)
LFKB-2		33.88849	-86.69532	Locust Fork at Armston Loop/Center Springs Rd (Vaughns Bridge)	2012 (8x), 2014(7x)
LFKB-8		33.80931	-86.80075	Locust Fork at Warrior-Kimberly Road	2012(8x)
LFKJ-3		33.74402	-86.91853	Locust Fork at Co Rd 77 "Hewitt Bridge"	2012(8x)

Figure 3.2.1 Locust Fork Monitoring 2012 – 2016 Stations



3.3 Siltation / Habitat Alteration Target Identification

For the purposes of evaluating if there is an existing siltation impairment on the Locust Fork, the biological health and habitat suitability of the Locust Fork in the listed reaches will be evaluated in the delisting decision. The biological health will be assessed based upon the overall health of the benthic macroinvertebrate communities, as represented by a culmination of community taxa richness, composition, and tolerance. These metrics have been established on a site-by-site basis based on observations/data for healthy streams similar in hydrology, ecology, and relative size. In addition, habitat assessments provide additional support by rating the suitability of stream conditions for aquatic flora and fauna.

The evaluation of the siltation impairment will also include an assessment of the surface water quality total suspended solid (TSS) data in comparison to eco-reference conditions. Furthermore, instream turbidity levels will be compared against the Department's numeric turbidity criterion, discussed in greater detail in section "4.2.2 Locust Fork – Turbidity." In summary, for the purposes of this delisting decision, the following information was used to arrive at an overall use support determination:

- Macroinvertebrate Assessments
- Habitat Assessments
- Numeric Water Quality Data (TSS and Turbidity)

Chapter 4. Monitoring Results and Data Analysis

4.1 Macroinvertebrate Assessments

During 2012, the Department conducted an intensive assessment of the macroinvertebrate community on the Locust Fork at four stations, involving the collection of macroinvertebrates for identification and enumeration in a laboratory. Benthic macroinvertebrate communities were evaluated using the Department's Nonwadeable Multi-habitat Bioassessment methodology (NWM-I), which consists of measuring the taxonomic richness, community composition, and community tolerance to assess the overall health of the macroinvertebrate community. Each score is based upon a comparison to least-impaired reference reaches characterized by similar drainage areas, gradient, and habitat. The results of the macroinvertebrate assessments illustrated in the figures below indicated the overall state of the macroinvertebrate community at all four stations on the Locust Fork to be in "fair" condition.

Table 4.1.1 Locust Fork 2012 Macroinvertebrate Assessment Results





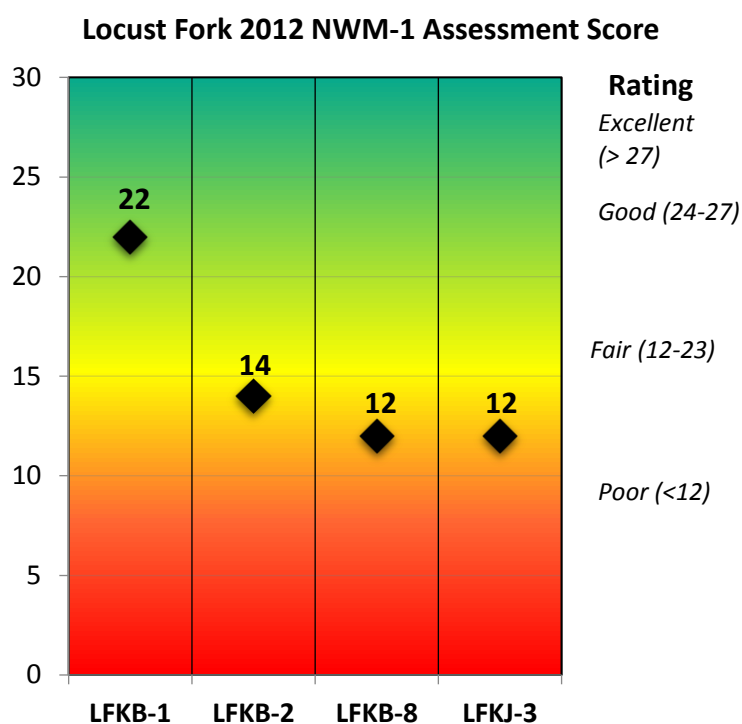
Station:	LFKB-1	LFKB-2	LFKB-8	LFKJ-3
Date:	6/20/2012	6/20/2012	6/20/2012	6/20/2012
Method:	NWM-I	NWM-I	NWM-I	NWM-I
Score:	22	14	12	12
Rating:				

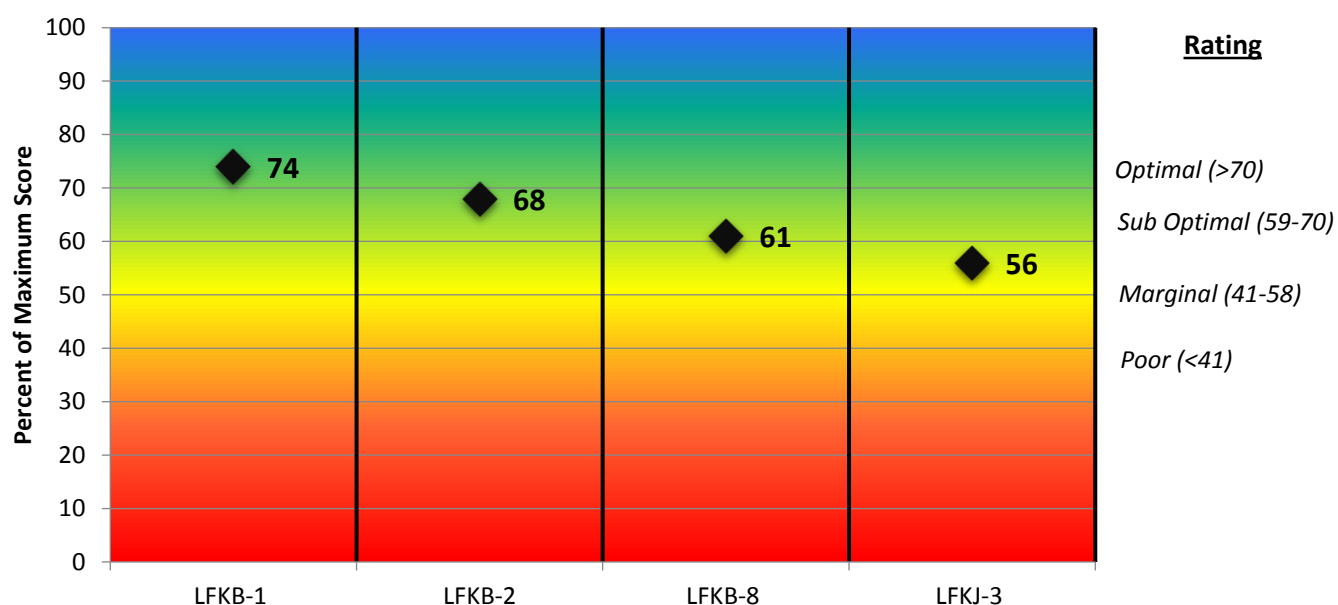
Figure 4.1.1 Locust Fork 2012 Macroinvertebrate Assessment Results

4.2 Habitat Assessments

Habitat assessments are typically conducted during the same station visit when macroinvertebrate assessments are performed. Reach characteristics and habitat conditions are evaluated based on several categories including instream habitat quality, sediment deposition, stream sinuosity, bank stability, and riparian buffer. The results are then compared to scores from reference reaches in the same or similar eco-regions in order to provide an overall indication of the quality and availability of habitat for aquatic life. Below are the results for the habitat assessments conducted for stations LFKB-1, LFKB-2, LFKB-8, and LFKJ-3.

Table 4.2.1 Locust Fork 2012 Habitat Assessment Results

Station:	LFKB-1	LFKB-2	LFKB-8	LFKJ-3
Date:	6/20/2012	6/20/2012	6/20/2012	6/20/2012
Habitat Assessment Score:	177	163	146	135
% Maximum Score :	74	68	61	56
Rating	Optimal	Sub-Optimal	Sub-Optimal	Marginal

Figure 4.2.1 Locust Fork 2012 Habitat Assessment Results

Habitat assessment scores provide an indication of the overall quality and availability of habitat for biological communities. Therefore, macroinvertebrate assessment scores need to be evaluated in conjunction with the habitat assessment scores for each particular station. The results of the habitat assessment scores indicate the quality of habitat along the Locust Fork is sufficient to support biological communities.

4.3 Conventional Water Quality Data

In 2010, ADEM published ecoregional reference guidelines for a number of parameters and pollutants. Reference streams, also referred to as “reference reaches” or “ecoregional reference sites,” are defined as relatively homogeneous areas of similar climate, land form, soil, natural vegetation, hydrology, and other ecologically relevant variables (USEPA, 2000b) which have remained comparatively undisturbed or minimally impacted by human activity over an extended period of time in relation to other waters of the State. While not necessarily pristine or completely undisturbed by humans, reference streams do represent desirable chemical, physical and biological conditions for a given ecoregion that can be used for evaluation purposes.

The reference streams selected for a particular analysis depends primarily on the number of available reference stations and associated data within a particular ecoregion. Therefore, the total number of reference sites selected and the aerial scale (i.e. Ecoregion Level III, Level IV) used to represent a reference condition will often vary on a case-by-case basis. For the purposes of this analysis, the available total suspended solids and turbidity water quality data collected at each station on the Locust Fork will then be compared to the applicable eco-reference guideline concentration, which is based on the 90th percentile of the data distributions from the selected eco-region reference sites. The eco-reference guideline concentration at each station is derived from the Level IV eco-reference coverage for that station's respective watershed, and is calculated based upon the weighted average guideline value. The table below illustrates the final weighted average eco-reference guideline total suspended solids and turbidity concentrations calculated for each station. See Appendix C for more information regarding the calculations of the appropriate eco-reference guideline concentrations.

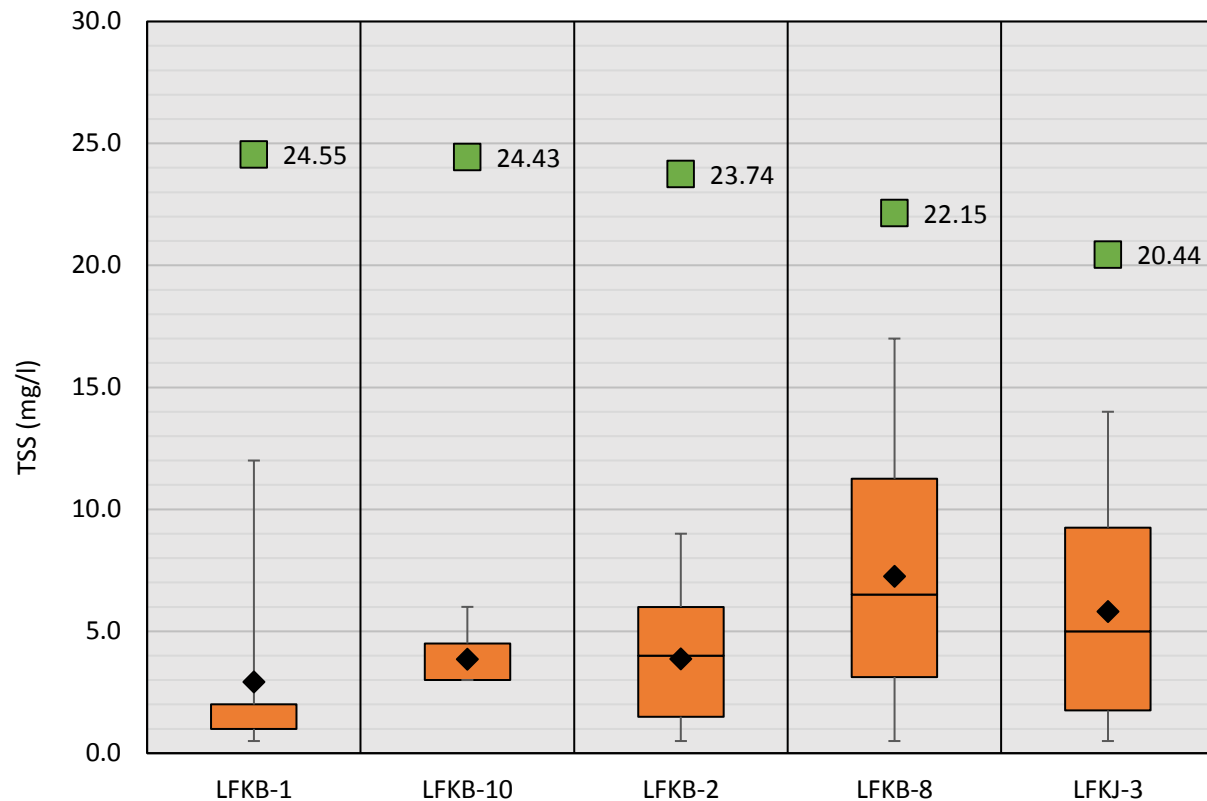
Table 4.3.1 Locust Fork Eco-Reference Guideline Concentrations

Station	2010 Ecoregional Reference Guideline	
	Total Suspended Solids (mg/l)	Turbidity (NTU)
LFKB-1	24.55	9.34
LFKB-10	24.43	9.35
LFKB-2	23.74	9.22
LFKB-8	22.15	9.22
LFKJ-3	20.44	9.23

4.3.1 Locust Fork – Total Suspended Solids

The box and whisker plot below summarizes the total suspended solids data collected on the Locust Fork. The “whiskers” represent the minimum and maximum observations, while the “box” represents the interquartile range (where the top line of the box is the 3rd quartile, the bottom line is the 1st quartile, and the middle line is the median of the dataset). The black diamond is representative of the average calculated concentration for that given station. The green square represents the applicable eco-reference guideline concentration for each station, as shown in Table 4.3.1.

Based upon the available data set, the total suspended solids samples collected at all five stations on the listed reaches of the Locust Fork were considerably less than the eco-reference guideline concentrations.

Figure 4.3.1.1 Locust Fork 2012 – 2016: Total Suspended Solids Results

4.3.2 Locust Fork - Turbidity

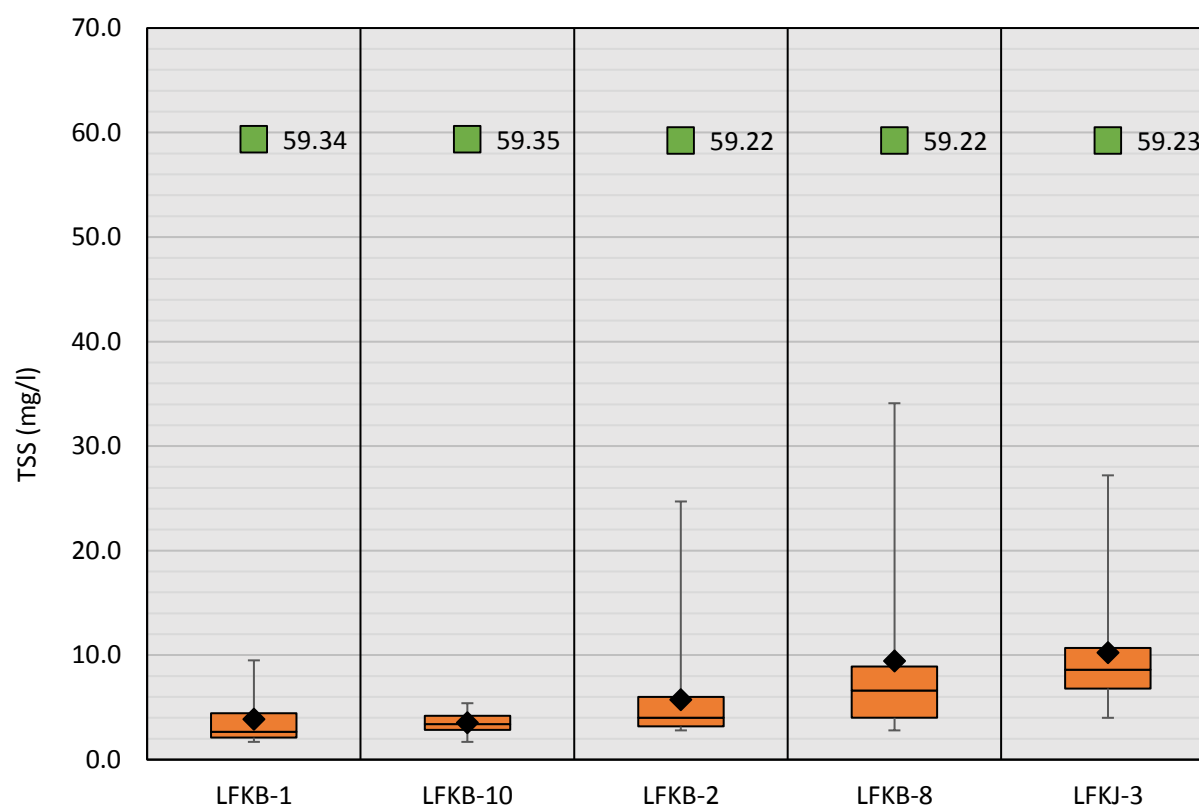
The current Departmental numeric turbidity criteria states that *“in no case shall turbidity exceed 50 nephelometric units above background.”* For the purposes of this Delisting Decision, the eco-reference guideline turbidity value for each station will be considered to be representative of “background” conditions. Therefore, the available turbidity samples from each station will be individually compared against the applicable numeric criterion (i.e., 50 plus eco-reference guideline turbidity) for that station in order to determine if the currently listed segments of the Locust Fork are now meeting their respective designated uses.

The table below presents an assessment of the available turbidity data collected along the listed reaches of the Locust Fork. Based upon the table below, all of the collected turbidity samples were less than the applicable numeric criterion.

Table 4.3.2.1 Locust Fork 2012 – 2016: Turbidity Results

Station	# of Turbidity Samples	Maximum measured NTU	Background Concentration (i.e. Eco-reference Concentration)	Turbidity Numeric Criterion (50 + Background)	# of Turbidity Samples > Numeric Criterion
LFKB-1	14	9.5	9.34	59.34	0
LFKB-10	7	5.4	9.35	59.35	0
LFKB-2	16	24.7	9.22	59.22	0
LFKB-8	9	34.1	9.22	59.22	0
LFKJ-3	9	27.2	9.23	59.23	0

The box and whisker plot below summarizes the turbidity data collected on the Locust Fork. The “whiskers” represent the minimum and maximum observations, while the “box” represents the interquartile range (where the top line of the box is the 3rd quartile, the bottom line is the 1st quartile, and the middle line is the median of the dataset). The black diamond is representative of the average calculated concentration for that given station. The green squares represents the applicable eco-reference guideline concentration for each station, as shown in Table 4.3.1.

Figure 4.3.2.1 Locust Fork 2012 – 2016: Turbidity Results

Chapter 4. Conclusion

From examination of all available data, ADEM has determined that a water quality impairment due to siltation does not currently exist for the Locust Fork. Therefore, ADEM will not develop a TMDL for siltation due to “more recent data,” which is a just cause for delisting waterbodies according to Title 40 of the Code of Federal Regulations (CFR), Part 130.7(b)(6)(iv).

Chapter 5. Public Participation

As part of the public participation process, this Delisting Decision will be placed on public notice and made available for review and comment. A public notice will be prepared and published in the major daily newspapers in Montgomery, Huntsville, Birmingham, and Mobile, as well as submitted to persons who have requested to be on ADEM’s postal and electronic mailing distributions. In addition, the public notice and subject Delisting Decision will be made available on ADEM’s Website: www.adem.state.al.us. The public can also request hard or electronic copies of the Delisting Decision by contacting Ms. Kimberly Minton at 334-271-7826 or kminton@adem.alabama.gov. The public will be given an opportunity to review the Delisting Decision and submit comments to the Department in writing. At the end of the comment period, all written comments received during the public notice period will become part of the administrative record. ADEM will consider all comments received by the public prior to final completion of this Delisting Decision and subsequent submission to EPA Region 4 for final approval.

Appendix A. References

Alabama Department of Environmental Management. Administrative Code, 2017. Water Quality Program, Chapter 335-6-10, Water Quality Criteria, and Chapter 335-6-11 Use Classifications for Interstate and Intrastate Waters.

Alabama Department of Environmental Management, Field Operations Division. *Alabama's Surface Water Quality Monitoring Plan 2000-2016*

United States Environmental Protection Agency. 1991. Guidance for Water Quality-Based Decisions: The TMDL Process, Office of Water, EPA 440/4-91-001.

United States Environmental Protection Agency 2000b. Nutrient Criteria Technical Guidance Manual: River and Streams. United States. Environmental Protection Agency, Office of Water. EPA 822-B-00-002.

Appendix B. Water Quality Data

STATION ID	ACTIVITY DATE	Flow cfs	Temp C	DO mg/l	pH su	Turbidity NTU	TSS mg/L	TSS dc
LFKB-1	4/12/2012 10:25	106.9	15	10.2	7.7	2.7	1	
LFKB-1	5/3/2012 10:44	51.3	23.8	7.2	7.3	2.4	1	< MDL 1
LFKB-1	6/21/2012 8:16		25.3	6.8	7.7	2		
LFKB-1	7/19/2012 10:14	180.3	27.2	7.4	7.2	7.4	12	
LFKB-1	8/14/2012 15:25	101.1	25.9	8.2	7.2	9.5	2	
LFKB-1	8/16/2012 11:35	63						
LFKB-1	9/12/2012 15:41	78.8	23.4	8.6	8	4.6	1	
LFKB-1	10/10/2012 15:37	130.6	16.8	10.3	7.9	3.9	7	
LFKB-1	11/14/2012 13:36	122.4	9.8	11.8	7.9	8.1	1	< MDL 1
LFKB-1	5/19/2015 12:00	105	23.7	10.3	8.6	1.7	2	
LFKB-1	7/21/2015 11:00	29	29.9	8.1	8.4	2.9	2	
LFKB-1	9/24/2015 11:15		23.6	8.9	8.6	2.6	2	
LFKB-1	5/17/2016 11:30	95	20.2	10.3	8.4	2.5	2	
LFKB-1	7/19/2016 10:10	14	29.2	7.3	7.9	1.8	4	
LFKB-1	9/20/2016 11:10	4.6	26.1	8.4	8	1.9	2	
LFKB-10	4/23/2014 11:10		17.3	10.7	8	2.9	5	
LFKB-10	5/22/2014 11:35		21.4	9.8	8	5	3	JQ1
LFKB-10	6/17/2014 11:00		25	8.8	7.9	5.4	6	
LFKB-10	7/22/2014 12:00		26.9	9	8	3.4	3	
LFKB-10	8/19/2014 12:30		27.5	8.6	7.9	2.8	3	
LFKB-10	9/24/2014 11:30		22.8	9	8.1	1.7	4	
LFKB-10	10/21/2014 13:00		17.3	10.2	7.9	3.4	3	
LFKB-2	4/12/2012 9:17	254.6	16.3	8.7	7.3	3.1	1	
LFKB-2	5/3/2012 9:42	104.4	25.4	6.9	7.7	3.1	1	< MDL 1
LFKB-2	6/7/2012 9:13	100	25.4	7	7.4	3.9	1	
LFKB-2	6/20/2012 14:48		29.8	9.7	8.5	2.8		
LFKB-2	7/19/2012 9:10	79.4	27.6	6.4	7	4.1	6	
LFKB-2	8/14/2012 13:37	157.9	26.6	7.6	6.9	24.7	2	
LFKB-2	9/12/2012 14:07	97.2	26.4	9.2	8.4	5.8	4	JQ6
LFKB-2	10/10/2012 13:10	150.3	18.5	11.5	8.6	3.8	6	
LFKB-2	11/14/2012 11:48	219.6	10.2	11.8	7.8	3.2	1	< MDL 1
LFKB-2	4/23/2014 12:45		19	11.4	8.5	3.4	4	
LFKB-2	5/22/2014 10:30		21.5	9.4	7.8	5.8	4	JQ1
LFKB-2	6/17/2014 10:00		25.6	8.2	7.6	7.5	9	
LFKB-2	7/22/2014 10:30	98.1	28	8	8	6.6	6	
LFKB-2	8/19/2014 11:00	69.2	27.3	7.2	7.7	4.5	6	
LFKB-2	9/24/2014 10:00	43.1	22.2	7.9	7.6	2.8	3	
LFKB-2	10/21/2014 11:15	91.4	17.6	9.1	7.9	6.6	5	
LFKB-8	4/11/2012 14:55	374	20	10.6	7.8	2.8	1	< MDL 1
LFKB-8	5/2/2012 14:16	113.5	26.3	10	7.9	3	1	< MDL 1
LFKB-8	6/6/2012 14:16	230.4	27	11.7	8.4	8.9	12	
LFKB-8	6/20/2012 11:43		27.3	8.1	7.8	4		
LFKB-8	7/18/2012 13:23	88.8	27.9	6.7	6.9	8.4	4	
LFKB-8	8/14/2012 11:55	136.1	25.5	6.7	6.7	34.1	17	
LFKB-8	9/12/2012 12:24	144.5	23.7	8.2	7.6	11.4	9	
LFKB-8	10/10/2012 11:26	199.6	16.9	10.2	7.9	6.6	11	
LFKB-8	11/14/2012 10:42	310.3	9.9	10.8	7.3	5.8	4	
LFKJ-3	4/11/2012 13:31	290.8	19.7	9.4	7.4	4	1	< MDL 1
LFKJ-3	5/2/2012 13:11	175.7	25.3	10	7.8	5.1	2	
LFKJ-3	6/6/2012 13:00	515.6	26.2	8.2	7.4	9.1	10	
LFKJ-3	6/20/2012 7:43		27.7	8.6	7.8	6.8		
LFKJ-3	7/18/2012 12:34		28.8	6.6	6.9	8.6	6	
LFKJ-3	8/14/2012 10:33	228.2	25.5	6.5	6.7	27.2	9	
LFKJ-3	9/12/2012 11:24	209.6	23.6	7.3	7.3	11.8	4	
LFKJ-3	10/10/2012 10:10	230.1	17	9.1	7.3	10.7	14	
LFKJ-3	11/14/2012 9:44	331.7	10.4	10.1	7.1	8.6	1	

Appendix C. Alabama 2010 Ecoregional Reference Guidelines

Parameters	Basis of comparison	Result to compare	Level 4 45a	Level 4 45d	Level 3 45	Level 4 65a/b	Level 4 65f	Level 4 65g	Level 4 65i	Level 4 65j	Level 4 65q	Level 4 67f	Level 4 67h	Level 3 67	Level 4 68d	Level 4 68e	Level 3 68	Level 4 71f	Level 3 71
Physical																			
Temperature (°C)	90th %ile	Median	24.656	25	25	27	24.6	27	25	24	27	24	26	25.7	25	23.48	24	22.12	22.586
Turbidity (NTU)	90th %ile	INDIVIDUAL	21.7	6.823	15	49.56	9.7	13.05	26.21	10.73	42.3	6.622	10.787	8.824	9.667	9.025	10.1	3.693	11.1
Total Dissolved Solids (mg/L)	90th %ile	Median	67.9	85.4	80	162.8	53.4	97.4	63.3	167.6	103.4	165	79.4	151.2	118	84.8	97.2	79.6	150.5
Total Suspended Solids (mg/L)	90th %ile	Median	16	12	15	45	13.2	16.3	27.5	26.9	104.6	11.3	12.7	12.4	27	10	14	9.6	8.9
Specific Conductance (µmhos)	Median	Median	40.1	37	39.05	129.7	20.4	53.4	25.8	70	72.5	207	34.35	86	49.5	37	39.15	96	109
Hardness (mg/L)	Median	Median	10.65	11.1	11	56	14	14.2	6.52	82.1	34.6	94.05	8.56	42.3	16.2	10	12.15	47.2	56
Alkalinity (mg/L)	90th %ile	Median	21.8	23.5	23.01	84.41	11.8	21.85	21.05	130.64	36.36	121.73	16.54	117.716	21	44.2	42.2	57.492	109.4
Stream Flow (cfs)																			
Chemical																			
Dissolved Oxygen (mg/L)	10th %ile	Median	7.665	7.6	7.6	5.1	6.94	4.484	6.692	7.64	6.8	7.44	7	7	5.609	7.51	6.79	8.113	7.61
pH (su)	10th %ile	Median	6.5	6.787	6.64	6.758	4.436	5.69	5.82	6.31	6.6	6.938	6.69	6.768	6.482	6.522	6.5	7.162	7.345
pH (su)	90th %ile	Median	7.68	7.679	7.7	8.052	6.55	6.815	7.18	8.1	7.74	8.294	8	8.278	7.352	7.852	7.84	8.35	8.34
Ammonia Nitrogen (mg/L)	90th %ile	Median	0.0078	0.0105	0.0105	0.04802	0.046	0.0203	0.0905	0.0932	0.074	0.0228	0.031	0.0346	0.119	0.0945	0.1007	0.023	0.023
Nitrate-Nitrite Nitrogen (mg/L)	90th %ile	Median	0.1241	0.0718	0.0974	0.286	0.3258	0.2432	0.2764	0.3436	0.0634	0.261	0.0888	0.2403	1.202	0.456	0.6191	0.6895	1.42
Total Kjeldahl Nitrogen (mg/L)	90th %ile	Median	0.40482	0.2598	0.28448	0.887	0.4176	0.583	0.6782	0.4858	0.6346	0.431	0.5107	0.5826	1.46	0.6595	0.733	0.624	0.466
Total Nitrogen (mg/L)	90th %ile	Median	0.53114	0.3224	0.40016	1.1634	0.6396	0.773	0.8512	0.8064	0.69205	0.6836	0.69365	0.7109	2.269	0.9185	1.41685	1.295	1.57
Dissolved Reactive Phosphorus (mg/L)	90th %ile	Median	0.0214	0.027	0.0243	0.0618	0.0264	0.0236	0.023	0.0167	0.0193	0.0174	0.0162	0.017	0.0109	0.019	0.0182	0.017	0.0155
Total Phosphorus (mg/L)	90th %ile	Median	0.0663	0.0537	0.0599	0.201	0.04	0.0698	0.0682	0.0577	0.064	0.0514	0.0429	0.0566	0.0491	0.0501	0.05	0.1059	0.0497
CBOD-5 (mg/L)	90th %ile	Median	2.57	2.37	2.4	3.2	1.96	2.65	2	2.53	2.3	1.78	2.58	2.3	1.86	1.9	1.9	1.1	1.1
Chlorides (mg/L)	90th %ile	Median	4.778	4.029	4.495	12.032	6.692	6.066	4.2852	5.247	5.95	4.266	3.61	3.89	9.118	1.051	6.37	2.4112	2.622
Total Metals																			
Aluminum (mg/L)	90th %ile	Median	0.2437	0.1558	0.1954	1.181	0.4886	0.2732	0.801	0.4045	1.561	0.2104	0.356	0.4114	0.155	0.265	0.3055	0.1954	0.127
Iron (mg/L)	90th %ile	Median	1.094	0.5648	0.8722	2.362	1.352	3.976	3.548	0.839	2.13	0.893	0.733	0.9803	0.6855	1.047	1.046	0.4085	0.4294
Manganese (mg/L)	90th %ile	Median	0.0554	0.0647	0.057	0.215	0.0436	0.7372	0.8094	0.081	0.113	0.067	0.052	0.0628	0.184	0.0563	0.1553	0.025	0.025
Dissolved Metals																			
Aluminum (mg/L)	90th %ile	Median	0.05485	0.0545	0.0545	0.1365	0.2242	0.0545	0.1	0.11	0.193	0.1	0.1	0.1	0.1	0.1	0.1	0.03	0.03
Antimony (µg/L)	90th %ile	Median	1	1	1	1	3.75	1	5	5	3.75	5	1	5		14	14	5	5
Arsenic (µg/L)	90th %ile	Median	5	5	5	5	5	5	5	5	5	9.2	5	5		5	5	12.1	12
Cadmium (mg/L)	90th %ile	Median	0.0435	0.0435	0.0435	0.0435	0.0394	0.0435	0.0435	0.0435	0.0435	0.0435	0.0435	0.0435		0.0448	0.04415	0.0075	0.0075
Chromium (mg/L)	90th %ile	Median	0.0395	0.0395	0.0395	0.0395	0.0321	0.0395	0.0395	0.0395	0.0395	0.0395	0.0395	0.0395		0.0416	0.04055	0.025	0.025
Copper (mg/L)	90th %ile	Median	0.043	0.043	0.043	0.043	0.0349	0.043	0.043	0.075	0.043	0.043	0.043	0.043	0.0298	0.043	0.043	0.1	0.1
Iron (mg/L)	90th %ile	Median	0.292	0.2248	0.256	0.503	0.6132	0.8042	0.5392	0.2445	1.255	0.1218	0.1885	0.2428	0.1552	0.588	0.588	0.025	0.0579
Lead (µg/L)	90th %ile	Median	1	1	1	1	2.5	1	5	5	2.5	5	1	5	1	5	5	5	5
Manganese (mg/L)	90th %ile	Median	0.02665	0.0235	0.0253	0.1224	0.0328	0.7886	0.8218	0.025	0.1084	0.025	0.0235	0.025		0.05	0.05	0.025	0.025
Mercury (µg/L)	90th %ile	Median	0.15	0.15	0.15	0.15	0.25	0.15	0.25	0.2	0.25	0.2	0.2	0.2	0.18	0.2	0.2	0.15	0.15
Nickel (mg/L)	90th %ile	Median	0.114	0.114	0.114	0.114	0.0936	0.114	0.05	0.114	0.114	0.0884	0.114	0.114		0.114	0.114	0.025	0.025
Selenium (µg/L)	90th %ile	Median	5	5	5	5	5	5	25	23	5	23	5	5		50	50	15	25
Silver (mg/L)	90th %ile	Median	0.058	0.058	0.058	0.058	0.0467	0.058	0.05	0.058	0.058	0.0548	0.058	0.058		0.058	0.058	0.025	0.025
Thallium (µg/L)	90th %ile	Median	0.5	0.5	0.5	0.5	4.5	0.5	5	5	4.5	5	0.5	5		18.5	18.5	5	5
Zinc (mg/L)	90th %ile	Median	0.0345	0.0345	0.0345	0.0345	0.0294	0.0345	0.0345	0.0345	0.0345	0.0345	0.0345	0.0345	0.0267	0.0438	0.0345	0.03	0.0285
Biological																			
Chlorophyll a (µg/L)	90th %ile	Median	5.019	2.14	2.67	5.181	1.755	1.282	4.732	3.31	3.949	2.562	2.086	2.322	1.392	2.458	2.67	3.044	4.255
Fecal Coliform (col/100 mL)	90th %ile	Median	332	116	201.2	1564	400	234	620	582	1025	141.6	152.2	197	829	252	320	200	435

Station	Level IV Ecoregion	Watershed Area (mi ²)	Watershed %	2010 Ecoregional Reference Guideline	
				Total Suspended Solids (mg/l)	Turbidity (NTU)
LFKB-1	68c - Plateau Escarpment	1.48	0.49%	14 ^a	10.1 ^a
	68b - Sequatchie Valley	13.37	4.42%	14 ^a	10.1 ^a
	68d - Southern Table Plateaus	252.93	83.54%	27.00	9.67
	67f - Southern Limestone/Dolomite Valleys and Low Rolling Hills	34.99	11.56%	11.30	6.62
	Weighted Average Eco-reference Guideline Concentration			24.55	9.34
LFKB-10	68c - Plateau Escarpment	1.48	0.48%	14 ^a	10.1 ^a
	68b - Sequatchie Valley	17.69	5.68%	14 ^a	10.1 ^a
	68d - Southern Table Plateaus	257.00	82.59%	27.00	9.67
	67f - Southern Limestone/Dolomite Valleys and Low Rolling Hills	34.99	11.25%	11.30	6.62
	Weighted Average Eco-reference Guideline Concentration			24.43	9.35
LFKB-2	68c - Plateau Escarpment	1.48	0.26%	14 ^a	10.1 ^a
	68b - Sequatchie Valley	28.29	4.89%	14 ^a	10.1 ^a
	68d - Southern Table Plateaus	454.32	78.48%	27.00	9.67
	67f - Southern Limestone/Dolomite Valleys and Low Rolling Hills	87.39	15.09%	11.30	6.62
	68e - Dissected Plateau	7.45	1.29%	10.00	9.03
	Weighted Average Eco-reference Guideline Concentration			23.74	9.22
LFKB-8	68c - Plateau Escarpment	1.48	0.21%	14 ^a	10.1 ^a
	68b - Sequatchie Valley	30.09	4.26%	14 ^a	10.1 ^a
	68d - Southern Table Plateaus	475.74	67.37%	27.00	9.67
	67f - Southern Limestone/Dolomite Valleys and Low Rolling Hills	109.43	15.50%	11.30	6.62
	68e - Dissected Plateau	34.11	4.83%	10.00	9.03
	68f - Shale Hills	55.34	7.84%	14 ^a	10.1 ^a
	Weighted Average Eco-reference Guideline Concentration			22.15	9.22
LFKJ-3	68c - Plateau Escarpment	1.48	0.17%	14 ^a	10.1 ^a
	68b - Sequatchie Valley	30.24	3.50%	14 ^a	10.1 ^a
	68d - Southern Table Plateaus	475.74	55.00%	27.00	9.67
	67f - Southern Limestone/Dolomite Valleys and Low Rolling Hills	139.19	16.09%	11.30	6.62
	68e - Dissected Plateau	60.24	6.96%	10.00	9.03
	68f - Shale Hills	158.05	18.27%	14 ^a	10.1 ^a
	Weighted Average Eco-reference Guideline Concentration			20.44	9.23

a. Level III guideline value used in the event that Level IV value is not available

Appendix D. Locust Fork Station Habitat Assessment Results

Figure D-1. Station LFKB-1 on June 21, 2012

Habitat Assessment	% Maximum Score	Rating
NW		
Instream Habitat Quality	69	Sub-optimal (59-70)
Sediment Deposition	76	Optimal (>70)
Sinuosity	30	Poor (<45)
Bank and Vegetative Stability	76	Optimal (>75)
Riparian Buffer	90	Sub-optimal (70-90)
Habitat Assessment Score	177	
% Maximum Score	74	Optimal (>70)

Figure D-2. Station LFKB-2 on June 20, 2012

Habitat Assessment	% Maximum Score	Rating
NW		
Instream Habitat Quality	67	Sub-optimal (59-70)
Sediment Deposition	65	Sub-optimal (59-70)
Sinuosity	40	Poor (<45)
Bank and Vegetative Stability	59	Marginal (35-59)
Riparian Buffer	80	Sub-optimal (70-90)
Habitat Assessment Score	163	
% Maximum Score	68	Sub-optimal (59-70)

Figure D-3. Station LFKB-8 on June 20, 2012

Habitat Assessment	% Maximum Score	Rating
NW		
Instream Habitat Quality	52	Marginal (41-58)
Sediment Deposition	63	Sub-optimal (59-70)
Sinuosity	75	Sub-optimal (65-84)
Bank and Vegetative Stability	55	Marginal (35-59)
Riparian Buffer	80	Sub-optimal (70-90)
Habitat Assessment Score	146	
% Maximum Score	61	Sub-optimal (59-70)

Figure D-4. Station LFKJ-3 on June 21, 2012

Habitat Assessment	% Maximum Score	Rating
NW		
Instream Habitat Quality	52	Marginal (41-58)
Sediment Deposition	54	Marginal (41-58)
Sinuosity	75	Sub-optimal (65-84)
Bank and Vegetative Stability	46	Marginal (35-59)
Riparian Buffer	70	Sub-optimal (70-90)
Habitat Assessment Score	135	
% Maximum Score	56	Marginal (41-58)

Appendix E. Locust Fork Station Pictures
Figure E.1 Locust Fork Station LFKB-1 (8/16/2012)



Figure E.2 Locust Fork Station LFKB-2 (6/20/2012)



Figure E.3 **Locust Fork Station LFKB-8 (6/20/2012)**



Figure E.4 **Locust Fork Station LFKJ-3 (6/20/2012)**

